PROCEEDINGS OF THE
ROYAL ENTOMOLOGICAL SOCIETY
OF LONDON
SERIES C. JOURNAL OF MEETINGS

VOLUME 25 No. 11, 1960

## REPORT OF THE COUNCIL, 1960

A review of the Society's activities for the past year, the 127th, shows steady development along established lines which is reflected in the publications, the Fellowship, the attendance at meetings, and in the use of the library.

As usual, ten meetings have been held during the year and the average attendance was 103, compared with 92 in the previous year. Many entomologists from overseas were in this country during the summer on the occasion of the VIIth Commonwealth Entomological Conference. It has been a pleasure to welcome them at the meetings and to include a number of them in the programme of speakers. During the Conference a Conversazione was held in the Society's rooms in honour of the delegates, at which Fellows were able to meet entomologists from abroad in a less formal atmosphere than at the Ordinary Meetings. Some 320 Fellows and guests were present.

As was briefly mentioned in the report for last year, a Committee has been set up under the chairmanship of Dr. J. S. Kennedy, to arrange a first Symposium Meeting. The subject will be " Insect polymorphism " and the meeting will take place on 21st–22nd September, 1961. It is hoped that this meeting, which is designed to bring together the results of recent work on this subject of wide biological importance, will prove of interest to a large number of entomologists. Full details of the programme will be issued in the spring.

The steady rise in the Fellowship continues, the total now standing at 1376, an increase of 28 (24)* for the year. This has resulted from the addition of 76 new Fellows, against which must be set the loss of 48 by death, resignation, and the operation of Bye-Law XVI (3). Details of these losses and of the present state of the Fellowship are set out in Appendix I.

Publication of the *Transactions*, *Proceedings* and *Handbooks for the Identification of British Insects* has continued on the same lines as in previous years. As mentioned in last year's report, the area of the type surface in the *Transactions* and *Proceedings* has now been increased so that more than 120 extra words are included on each page. Although the total number of pages published is less than last year, the actual amount of matter published is, in fact, more.

The fourteen papers comprising Volume 112 of the *Transactions* appeared at intervals during the year, and the *Proceedings* were continued in the usual three series. Two parts of the *Handbooks* were published in August, one in Volume VII (Hymenoptera), completing the key to the subfamily Ichneumoninae, and the other in Volume II (Hemiptera), dealing with the Fulgoromorpha. Synoptic details of the numbers of pages and papers published, and the subjects dealt with, are included as Appendix II of this Report.

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* The numbers in brackets are the corresponding figures for the previous year.

The number of books and periodicals lent to Fellows and Institutions shows a substantial increase over the previous year, the total number of loans being 2189 (1835), including 96 to the National Central Library and 7 to the Association of Special Libraries and Information Bureaux. The number of borrowers was 1012 (919). Owing to staff changes it has not been possible to arrange for the usual amount of binding. The Society is again indebted to the many Fellows and Organisations who present copies of their works.

The Finance and House Committee, and the Publication and Library Committee have taken care of the detailed work of the Society under the chairmanship of Professor D. S. Bertram and Mr. R. G. Davies respectively. The Conservation (Insect Preservation) Committee, under the chairmanship of Mr. R. B. Benson, continues to maintain contact with the Nature Conservancy through the Entomological Liaison Committee. Council is grateful to the members of the Committees for their valuable services to the Society.

Dr. John Smart has been appointed to represent the Society on the Committee of Management of Wicken Fen, in place of the late Mr. Edelsten, and Mr. R. B. Benson has succeeded Mr. E. B. Britton as the Society's representative on the British Committee for International Nature Conservation. At the request of the Royal Society, the Society's delegates to the British National Committee for Biology have been reduced from two to one, Dr. H. E. Hinton continuing to represent the Society.

A large number of Fellows attended the XIth International Congress of Entomology in Vienna in August. At the final Plenary Session, the Society's invitation to hold the XIIth Congress in London in 1964 was accepted. The necessary organisational machinery has now been set up and provisional arrangements made for the Congress to be held in South Kensington, from 15th–23rd July, 1964.

An illuminated address of congratulation was presented to the Royal Society on the occasion of their Tercentenary in July ; the Society was represented at the opening ceremony by Dr. J. S. Kennedy.

Mr. P. F. Mattingly represented the Society at the Cardiff meeting of the British Association, Mr. M. J. Way at a meeting organised by the Council for Nature to consider the use of toxic chemicals in agriculture, and Mr. G. M. Spooner at a conference called by the Devon County Council to consider the War Department's new proposals regarding Braunton Burrows.

At the invitation of the Ministry of Agriculture's Research Study Group on Toxic Chemicals the Society has submitted a memorandum on the need for further research into the effects of the use of such chemicals in agriculture.

The Society continues to benefit in many ways from the presence of its tenants, the Mineralogical Society and the Institute of Biology with its sub-tenant the Council for Nature.

It is not easy to cater fully for, let alone co-ordinate, the very varied needs of the whole Fellowship, a large part of which is resident abroad, but in its development plans Council tries to maintain a reasonable balance, modifying it to changing needs.

## Appendix I—The Fellowship

During the year 1960 the Society has lost 48 (47) Fellows. The detailed statement is as follows :

### 1 (3) *Honorary and* 10 (13) *Ordinary Fellows by death*

H. Scott (Honorary Fellow)
E. Bagwell-Purefoy
A. W. Boyd
B. D. Cooke
G. Crisp
W. A. Lamborn
E. M. Marsden-Jones
L. Nathan
A. O. Rowden
J. D. Sherman
D. C. Swan

### 18 (18) *Fellows by Resignation*

P. R. Boyce
A. L. Bridgen
B. A. Cooper
R. M. Gordon
Miss D. E. Griffin
S. W. Hedgcock
G. S. Lawrence
R. H. Le Pelley
D. B. Long
C. D. Putnam
A. A. Savage
A. C. Sen
P. J. Smart
P. Siviter Smith
R. Underwood
R. Veitch
J. K. Williams
W. N. Yule

### 19 (13) *Fellows under Bye-Law XVI* (3)

J. A. Aggarwal
M. A. R. Ansari
K. R. Bhatia
O. S. Bindra
H. L. G. Boyce
J. S. C. Dealey
J. D. Hood
D. L. Jackson
R. Levi-Castillo
A. J. Newson
B. A. Penney
A. Pringle
H. R. Ra'Afat
A. Sattar
G. Sharma
P. D. Srivastava
T. V. Venkatraman
G. C. Warrick
Mrs. J. M. Young

During the year 82 (82) Fellows have been elected, of whom 60 had qualified by 31st December. 16 Fellows elected in 1959 completed the formalities in 1960, giving a total of 76 new Fellows. The number of Fellows on the list is 1376 (1348) (21 Honorary Fellows and 1355 Ordinary Fellows) with a further 20 to complete their obligation.

## Appendix II—The Publications

The Publications for the year 1960 comprised 1056 pages. The detailed statement is as follows :

| | *Transactions* *Volume* 112 475 pages (new size) 2 plates | *Proceedings A* *Volume* 35 177 pages (new size) 1 plate | *Proceedings B* *Volume* 29 178 pages (new size) – plates |
|---|---|---|---|
| *Subjects dealt with* | *Number of papers included* | | |
| Diptera | 5 | 10 | 13 |
| Coleoptera | 4 | 1 | 7 |
| Hymenoptera | . | 3 | 3 |
| Trichoptera | 1 | 4 | . |
| Hemiptera | 2 | 3 | 3 |
| Lepidoptera | 1 | 1 | 1 |
| Collembola | . | 1 | 2 |
| Odonata | . | 2 | . |
| Ephemeroptera | . | . | 2 |
| Dermaptera | . | 1 | 1 |
| Isoptera | . | 1 | 1 |
| Psocoptera | 1 | . | . |
| Siphonaptera | . | . | 1 |
| Orthoptera | . | 1 | . |
| General | . | 3 | . |
| | 14 | 31 | 34 |

*Proceedings, Series C. Journal of Meetings*

Volume 25, Nos. 1–10 have appeared in advance of the Ordinary Meetings. No. 11 will include the Annual Reports and Accounts, and the volume will comprise about 80 pages.

*Handbooks for the Identification of British Insects*

Volume II, Part 3. Hemiptera-Homoptera : Fulgoromorpha, by W. J. Le Quesne. 68 pages.

Volume VII, Part 2 (*aii*). Hymenoptera : Ichneumonoidea (contd.), by J. F. Perkins. 96 pages.

## TREASURER'S REPORT

I wish to place before you the balance sheets and accounts of our Society for the year ended 31st December, 1960. They have been audited by W. B. Keen and Co. The accounts are in the same form and follow the pattern of the previous year. You would wish me to make some remarks, and give you a general picture of what they contain.

Firstly, in the General Fund on the Income side. The figure for subscriptions shows a slight decrease of £45 on the previous year, although the Fellowship continues to rise. We now have a very large proportion of overseas Fellows, and it has been thought wise to put a low value on the arrears outstanding at the end of the year. Last year the value we put on these proved to be too high.

The sale of our publications (excluding *Handbooks*) is a most fluctuating source of income. Last year's high figure was due to a drive to sell runs of early volumes, a market which we believe, has now been largely taken up. This year, there has been a drive to obtain new regular subscribers. The total income from this source amounts to £5354, a decrease of £1473.

Our tenants are on seven-year leases, and pay a fixed proportion of the house expenses, so that income from this source fluctuates only with housekeeping costs. The increase of £34 shown under this heading represents the first full year's extra rent from the Council for Nature, sub-tenants of the Institute of Biology.

Interest on investments and bank deposits are a record at £1211. Under this heading we benefit from the additional £1000 invested, and during the year our capital was enlarged by rights issues of Courtaulds, City of London Real Property and F. W. Woolworth & Co., all of which have been incorporated in the accounts as shown.

If we now look on the expenditure side, we see that house expenditure under the various headings runs at approximately the same level as previous years, except for fuel and light, which show a substantial increase, explained partly by rising costs, increased consumption now that an extra floor is in use, and by the increased use of the meeting room which is separately heated.

The figures for office expenditure show an increase under most headings, but fall within the sums estimated at the beginning of the year.

The amount published in the *Transactions* and *Proceedings* has been maintained at the same level, but the more economical presentation has made it possible to keep pace with rising costs, and there is even a slight saving of £52 on last year's figure.

Expenditure on the library is rather less than budgeted for, staff changes having caused some interruption in the work, particularly with binding.

After placing the usual £200 to the Repairs Fund, and £200 to the Contingencies Fund we finish with an excess of income over expenditure of £119.

Let us now turn to our Special Funds.

*Handbooks* continue to sell well and the small excess of expenditure over income of £35 is due to the fact that it was necessary to reprint some of the earlier parts of which a smaller edition was printed than is now the case. There is, of course, less call for a reprint than for the original issue.

*The Repairs and Improvements Fund* now stands at £1262 ; external and internal repairs and redecoration will fall due in the not very distant future and it is our policy always to build up this fund to meet the liability.

*The Contingencies Fund* now stands at £836. It is available for exceptional calls on the Society, which cannot normally be met from the General Fund. It will probably be necessary to draw on this Fund in order to finance the Symposium, which is international in character, to be held in September.

On the General balance sheet, £3580 is shown as Balances at Bank and Cash in Hand and £1653 as Sundry Debtors. Now, Council has decided to provide funds to the organisers of the 12th International Congress of Entomology and a first loan of £250 has been made. Our Investments are valued at £28,550. But our stocks of publications, our freehold premises, 41, Queen's Gate, and our Library are not valued.

In conclusion I have two tasks to perform. I have been Treasurer of our Society for the past nine years, and indeed served on the Finance Committee for eleven years, and I now stand down.

Firstly, I wish to thank all the honorary and executive officers who have given me so much help during these past years, and secondly to welcome the new Treasurer, Dr. Butler, and wish him every success.

# THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

## STATEMENT OF INCOME AND EXPENDITURE for the Year ended 31st December, 1960

(Presented at the Annual Meeting, 1st February, 1961)

## GENERAL FUND

| 1959 £ | 1959 £ | INCOME | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| | | To Subscriptions— | | | | | | |
| | 225 | Received in Advance for 1960 .. | 201 | 14 | 7 | | | |
| | 3,681 | Received in 1960 for 1960 .. .. | 3,765 | 16 | 5 | | | |
| | 174 | Received in 1960 for previous years | 117 | 13 | 7 | | | |
| | 4,080 | | 4,085 | 4 | 7 | | | |
| | 150 | *Less* Subscriptions in arrear at 31st December 1959 valued at .. | 175 | 0 | 0 | | | |
| | 3,930 | | 3,910 | 4 | 7 | | | |
| | 175 | *Add* Subscriptions in arrear at 31st December 1960 valued at .. | 150 | 0 | 0 | | | |
| 4,105 | | | | | | 4,060 | 4 | 7 |
| 510 | | Income Tax recovered in respect of Covenanted Subscriptions for the two years ended 5th April, 1957. | | | | — | — | — |
| 987 | | Interest on Investments (gross) .. | | | | 1,114 | 11 | 4 |
| | | ,, Publications— | | | | | | |
| | 6,827 | Sales .. .. .. .. .. .. | 5,354 | 2 | 8 | | | |
| | 500 | Transfer from Library Fund—Value of Exchanges .. .. | 500 | 0 | 0 | | | |
| 7,327 | | | | | | 5,854 | 2 | 8 |
| | | ,, Sub-Tenants— | | | | | | |
| | 517 | Rent .. .. .. .. .. .. | 525 | 0 | 0 | | | |
| | 385 | Contributions to House Expenses .. | 411 | 10 | 3 | | | |
| 902 | | | | | | 936 | 10 | 3 |
| 45 | | ,, Interest on Bank Deposits .. .. | | | | 96 | 10 | 3 |
| 41 | | ,, Miscellaneous Receipts .. .. | | | | 129 | 18 | 8 |
| £13,917 | | | | | | £12,191 | 17 | 9 |

| 1959 £ | 1959 £ | EXPENDITURE | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| | | By House Expenses— | | | | | | |
| | 644 | Wages .. .. .. .. | 666 | 14 | 3 | | | |
| | 40 | Superannuation Contributions .. | 39 | 11 | 6 | | | |
| | 237 | Fuel, Gas and Electric Light .. | 357 | 11 | 8 | | | |
| | 92 | Insurance .. .. .. .. | 89 | 15 | 0 | | | |
| | 30 | Water .. .. .. .. | 30 | 6 | 9 | | | |
| | | Repairs and Improvements Fund— | | | | | | |
| | 800 | Transfer .. .. .. .. | 200 | 0 | 0 | | | |
| | 49 | Miscellaneous .. .. .. .. | 40 | 18 | 4 | | | |
| 1,892 | | | | | | 1,424 | 17 | 6 |
| | | ,, Office and Meeting Expenses— | | | | | | |
| | 2,437 | Salaries .. .. .. .. | 3,153 | 5 | 6 | | | |
| | 186 | Superannuation Contributions .. | 209 | 14 | 7 | | | |
| | 124 | Printing and Stationery .. .. | 197 | 10 | 6 | | | |
| | 299 | Postage and Telephone .. .. | 339 | 12 | 6 | | | |
| | 105 | Audit Fee .. .. .. .. | 105 | 0 | 0 | | | |
| | 126 | Miscellaneous .. .. .. | 191 | 1 | 11 | | | |
| | 3,277 | | 4,196 | 5 | 0 | | | |
| | 450 | *Less* Proportion of Salaries, Stationery and Postage allocated to *Handbooks of British Insects* .. | 450 | 0 | 0 | | | |
| 2,827 | | | | | | 3,746 | 5 | 0 |
| | | ,, Library Fund— | | | | | | |
| | 550 | Transfer .. .. .. .. | 393 | 12 | 6 | | | |
| | 500 | Ditto Value of Exchanges .. | 500 | 0 | 0 | | | |
| 1,050 | | | | | | 893 | 12 | 6 |
| | | ,, Publications— | | | | | | |
| | 5,879 | Expenditure .. .. .. | 5,774 | 4 | 2 | | | |
| | | 68 *Less* Donations .. — — — | | | | | | |
| | 68 | Westwood Bequest 14 7 8 | 14 | 7 | 8 | | | |
| 5,811 | | | | | | 5,759 | 16 | 6 |
| | | ,, Donations— | | | | | | |
| | 25 | *Zoological Record* .. .. .. | 25 | 0 | 0 | | | |
| | — | Oxshott Heath Conservators .. | 10 | 0 | 0 | | | |
| | 5 | Council for Nature .. .. .. | 5 | 5 | 0 | | | |
| | 5 | Wicken Fen Fund .. .. .. | 5 | 0 | 0 | | | |
| | 3 | British Committee for International Nature Conservation .. .. | 3 | 0 | 0 | | | |
| 38 | | | | | | 48 | 5 | 0 |
| 1,000 | | ,, Transfer to Contingencies Fund .. | | | | 200 | 0 | 0 |
| 1,299 | | ,, Excess of Income over Expenditure for year carried to Balance Sheet .. | | | | 119 | 1 | 3 |
| £13,917 | | | | | | £12,191 | 17 | 9 |

## STATEMENT OF INCOME AND EXPENDITURE for the Year ended 31st December, 1960 (*continued*)

### LIBRARY FUND

| 1959 £ | 1959 £ | INCOME | £ s. d. | £ s. d. |
|---|---|---|---|---|
| | | To Interest on Investments— | | |
| 35 | | Hamilton Druce Bequest Fund .. | | 34 10 0 |
| | | ,, General Fund— | | |
| | 550 | Transfer .. .. .. .. | 393 12 6 | |
| | 500 | Ditto Value of Exchanges .. | 500 0 0 | |
| 1,050 | — | | | 893 12 6 |
| £1,085 | | | | £928 2 6 |

| 1959 £ | 1959 £ | EXPENDITURE | £ s. d. | £ s. d. |
|---|---|---|---|---|
| | 410 | By New Books .. .. .. .. | 265 17 3 | |
| 550 | 140 | ,, Binding, Repairs and Insurance .. | 127 15 3 | |
| | — | | | 393 12 6 |
| 500 | | ,, Transfer to Sales of Publications—Value of Exchanges .. .. .. .. | | 500 0 0 |
| 35 | | ,, Excess of Income over Expenditure for year carried to Balance Sheet ... | | 34 10 0 |
| £1,085 | | | | £928 2 6 |

### REPAIRS AND IMPROVEMENTS FUND

| 1959 £ | INCOME | £ s. d. |
|---|---|---|
| 800 | To General Fund—Transfer .. .. .. .. .. | 200 0 0 |
| £800 | | £200 0 0 |

| 1959 £ | EXPENDITURE | £ s. d. |
|---|---|---|
| 189 | By Repairs and Improvements .. .. .. .. .. | 27 4 6 |
| 611 | ,, Excess of Income over Expenditure for the year carried to Balance Sheet .. .. .. .. .. .. | 172 15 6 |
| £800 | | £200 0 0 |

### HANDBOOKS OF BRITISH INSECTS

| 1959 £ | INCOME | £ s. d. |
|---|---|---|
| 1,389 | To Sales .. .. .. .. .. .. .. .. .. | 1,361 19 4 |
| 44 | ,, Excess of Expenditure over Income for the year carried to Balance Sheet .. .. .. .. .. .. | 35 10 8 |
| £1,433 | | £1,397 10 0 |

| 1959 £ | EXPENDITURE | £ s. d. |
|---|---|---|
| 983 | By Printing .. .. .. .. .. .. .. .. | 947 10 0 |
| 450 | ,, Proportion of Salaries, Stationery and Postage .. .. | 450 0 0 |
| £1,433 | | £1,397 10 0 |

### CONTINGENCIES FUND

| 1959 | INCOME | |
|---|---|---|
| 1,000 | To General Fund Transfer .. .. .. .. .. .. | 200 0 0 |
| — | ,, Excess of Expenditure over Income for the year carried to Balance Sheet .. .. .. .. . .. | 163 8 4 |
| £1,000 | | £363 8 4 |

| 1959 | EXPENDITURE | |
|---|---|---|
| — | By Conversazione .. .. .. .. .. .. | 293 8 10 |
| — | ,, Expenses in connection with attendance at the 11th International Congress of Entomology in Vienna .. | 69 19 6 |
| 1,000 | ,, Income for the year carried to Balance Sheet .. .. | — — — |
| £1,000 | | £363 8 4 |

# GENERAL BALANCE SHEET, 31st December, 1960

| | £ s. d. | £ s. d. | £ s. d. |
|---|---|---|---|
| Sundry Creditors— | | | |
| Printing Publications | | 1,730 2 6 | |
| Office Expenses etc. | | 533 9 7 | 2,263 12 1 |
| Subscriptions received in advance | | | 147 7 10 |
| Provision for cost of outstanding Publications | | | 350 0 0 |
| *Special Funds*— | | | |
| *Library*— | | | |
| Balance at 1st January, 1960 | 1,246 3 1 | | |
| *Add* Excess of Income over Expenditure for the year to date | 34 10 0 | 1,280 13 1 | |
| *Repairs and Improvements*— | | | |
| Balance at 1st January, 1960 | 1,089 17 1 | | |
| *Add* Excess of Income over Expenditure for the year to date | 172 15 6 | 1,262 12 7 | |
| *Handbooks of British Insects*— | | | |
| Balance at 1st January, 1960 | 1,078 14 0 | | |
| *Less* Excess of Expenditure over Income for the year to date | 35 10 8 | 1,043 3 4 | |
| *Staff Provident Fund*— | | | |
| Balance at 1st January, 1960 | | 608 2 11 | |
| *The Hugh Main Fund for the Advancement of Entomology*— | | | |
| Balance at 1st January, 1960 | | 12,693 1 7 | 16,887 13 6 |
| *Contingencies Fund*— | | | |
| Balance at 1st January, 1960 | | 1,000 0 0 | |
| *Less* Excess of Expenditure over Income for year to date | | 163 8 4 | 836 11 8 |
| *General Fund*— | | | |
| Balance at 1st January, 1960 | | 1,416 4 11 | |
| *Add* Excess of Income over Expenditure for the year to date | | 119 1 3 | 1,535 6 2 |
| *Capital Reserve*— | | | |
| Balance at 1st January, 1960 | | 11,870 6 6 | |
| *Add* Amounts received during the year to date— | | | |
| Admission Fees | 109 4 0 | | |
| Legacy the late R. W. Lloyd Esq. | 160 0 0 | 269 4 0 | 12,139 10 6 |
| (The above includes the Cockayne Bequest of £1,000 in 1957 and the Rait-Smith bequest of £1,000 in 1959) | | | |
| | | | £34,160 1 9 |

| | £ s. d. | £ s. d. |
|---|---|---|
| Balances at Bank and Cash in Hand | | 3,580 9 11 |
| Sundry Debtors— | | |
| Subscriptions valued at | 150 0 0 | |
| Publications valued at | 1,250 0 0 | |
| Contributions to House Expenses | 102 18 8 | |
| Miscellaneous | 150 8 8 | 1,653 7 4 |
| Loan to Organisers of the 12th International Congress of Entomology | | 250 0 0 |
| Insurance Premiums paid in advance | | 126 1 4 |
| Investments at cost or market value at date of transfer to the Society— | | |
| £5,000 0 0 2½% Consolidated Stock | 3,974 15 0 | |
| £1,079 5 5 3% Funding Loan 1959/69 | 1,001 2 6 | |
| £200 0 0 3% Savings Bonds 1955/65 | 200 0 0 | |
| £400 0 0 3% Savings Bonds 1960/70 | 384 0 0 | |
| £600 0 0 3½% War Loan | 609 2 0 | |
| £4,000 0 0 British Electricity 3% Guaranteed Stock 1968/73 | 3,596 17 8 | |
| £5,000 0 0 British Electricity 3% Guaranteed Stock 1974/77 | 4,100 0 0 | |
| £3,429 13 6 3% Redemption Stock 1986/96 | 3,267 0 9 | |
| £1,000 0 0 Middlesex County Council 5¼% Redeemable Stock 1980 | 991 19 6 | |
| £1,155 0 0 Australia 4% Stock 1955/70 | 997 16 8 | |
| £198 0 0 City of London Real Property Co. Ltd. Ordinary Stock | 537 14 6 | |
| £2,400 0 0 Courtaulds Ltd. Ordinary Stock | 4,037 8 9 | |
| £500 0 0 General Electric Co. Ltd. 6% Unsecured Loan Stock 1979/84 | 502 11 0 | |
| £780 0 0 General Electric Co. Ltd. Ordinary Stock | 2,315 0 6 | |
| 10 Shares of $2.50 each Hudson's Bay Oil and Gas Co. Ltd. | 45 1 4 | |
| £660 0 0 Imperial Chemical Industries Ltd. Ordinary Stock | 987 19 0 | |
| £62 10 0 Rediffusion Ltd. Ordinary Stock | 509 18 3 | |
| £52 10 0 F. W. Woolworth & Co. Ltd. Ordinary Stock | 491 15 9 | 28,550 3 2 |
| (*Market Value at date* £25,046) | | |
| | | £34,160 1 9 |

The Society owns the Freehold Premises 41, Queen's Gate, London, S.W.7.

No amount is included for the value of the Stock of Publications.

The Society holds a sum of £21 8*s.* 5*d.* on behalf of the Permanent Committee of the International Congresses of Entomology.

# BALANCE SHEET, 31st December, 1960

## TRUST FUNDS

| | £ s. d. | | £ s. d. | £ s. d. |
|---|---|---|---|---|
| HAMILTON DRUCE BEQUEST FUND— | | HAMILTON DRUCE BEQUEST— | | |
| As at 1st January, 1960 .. .. .. .. .. .. | 1,095 15 6 | Investments— | | |
| | | £406 2*s*. 2*d*. Mersey Docks and Harbour Board 3¼% Debenture Stock 1970/80 at cost .. .. .. | 418 11 6 | |
| | | £593 17*s*. 10*d*. Ditto, transferred from Capital Reserve Fund in 1946 at Market Value .. .. | 610 4 6 | |
| | | £70 6*s*. 6*d*. 3% Redemption Stock 1986/96 at cost .. | 66 19 6 | |
| | | (*Market Value at date £711.*) | | 1,095 15 6 |
| WESTWOOD BEQUEST FUND— | | WESTWOOD BEQUEST— | | |
| As at 1st January, 1960 .. .. .. .. .. .. | 250 0 0 | Investment at cost— | | |
| | | £239 12*s*. 4*d*. Birmingham Corporation 3% Stock 1947 | | 250 0 0 |
| | | (*Market Value at date £117.*) | | |
| | £1,345 15 6 | | | £1,345 15 6 |

(*Sgd.*) N. E. HICKIN, *Hon. Treasurer.*

We have examined the above General Balance Sheet, the Trust Fund Balance Sheet, and accompanying Income and Expenditure Accounts with the books and vouchers of the Society, and certify them to be in accordance therewith. We have verified the Investments and Bank Balances. The Solicitors have certified that they hold the deeds of No. 41, Queen's Gate for safe custody on behalf of the Society.

*Finsbury Circus House,*
*Blomfield Street,*
*London, E.C.2.*
18*th January*, 1961.

(*Sgd.*) W. B. KEEN & Co.,
*Chartered Accountants.*

## THE PRESIDENT'S REMARKS

Ladies and Gentlemen,

It is my sad duty to report to you the losses sustained by our Society during the last year.

Hugh Scott, F.R.S., born 16th September, 1885, was a Fellow for over 50 years and an Honorary Fellow since 1954. He commenced his entomological career under Dr. David Sharp, whom he succeeded as curator of the Zoological Museum, Cambridge University, and since 1930 until retirement in 1948 he was assistant keeper in the British Museum (Natural History). His greatest contributions to entomology were associated with a series of collecting expeditions to the Seychelle Islands (1908), Ethiopia (1926–27, 1948–49, and 1952–53) and the Aden Protectorate and Yemen (1937–38), from which he brought home extensive material of all insect groups, and, moreover, with characteristic persistence, ensured that most of it has been worked out by specialists and published, providing data for zoogeographical conclusions concerning these little-known faunas. His own taxonomic speciality was Coleoptera and Nycteribiidae (Diptera) and he contributed to the field of ecology by valuable papers on the faunas associated with giant lobelias and the tree Senecios of East African mountains, and on the fauna of the leaf axils of Bromeliaceae.

Edward Bagwell-Purefoy, elected in 1909, was one of our oldest Fellows as he was born on 25th November, 1868, and died when 92 years old. An amateur lepidopterist, he will be particularly remembered for his original investigations on the life-history of the Large Blue (*Maculinea arion* (L.)), the caterpillar of which lives in ants' nests. He was also instrumental in three attempts to establish continental races of *Lycaena dispar* (Haworth) in this country, one of which, *dispar batavus* Oberth., is still flourishing at Wood Walton Fen.

Arnold Whitworth Boyd, born in 1885, and a Fellow since 1910, was a cotton yarn manufacturer by profession and a keen amateur naturalist. His main entomological interest was in Lepidoptera of North England and he has done much to help young beginners.

Brian Digby Cook, a young coleopterist, born on 21st June, 1939, was our Fellow for only two years and died prematurely while doing National Service in Malaya.

Geoffrey Crisp, elected to the Fellowship in 1953, was a medical entomologist, who spent his short working life in Ghana and Sierra Leone. The work involved long and patient investigations of the life-history and habits of *Simulium damnosum* Theobald, a carrier of a worm (*Onchocerca*) causing blindness (onchocerciasis), with a view to planning control methods.

William Alfred Stedwell Lamborn, O.B.E., was another of the senior generation of our Fellows, being elected to the Fellowship in 1911. He was born in 1877, qualified at the Middlesex Hospital in 1899 and in 1905 went to British Guiana as an Assistant Medical Officer at the Public Hospital. Still as a medical doctor, he worked in Natal, Nigeria, and the Federated Malay States. In 1913 he was appointed Government Entomologist in Nigeria, and then became a travelling entomologist for the Imperial Bureau (now the Commonwealth Institute) of Entomology, mainly for tsetse investigations; in 1917–18 he was medical officer in Tanganyika and Nyasaland, and later again a medical entomologist, first in Malaya, then in Nyasaland. His entomological work developed under the strong and beneficial influence of Professor E. B. Poulton. His main interest was the habits and biology of tropical insects, on which he made many original observations, abundantly supported by specimens and detailed notes, which are deposited in the Hope Department, Oxford.

Eric Marsden-Jones, born in 1887, was a botanist and held a temporary post at Kew Gardens. He was elected to the Fellowship in 1942 and his entomological interest was in insects associated with pollination of plants ; he has also worked out complicated life-histories of some Cynipidae.

Leonard Nathan, born in 1883, and a Fellow since 1939, was another amateur naturalist, with special interest in British Lepidoptera. As the Honorary Secretary of the North-Western Naturalists' Union and of the Manchester Entomological Society, he has done much to stimulate and to help younger colleagues.

Alfred Oliver Rowden, born in 1877 and first elected to the Fellowship in 1913, was a managing director of a dairy company and a keen amateur naturalist with wide interests in the wild life of Devonshire, including insects.

John Dempster Sherman, born 1872 in the United States, and elected to the Fellowship in 1923, was not himself an entomologist, but is very widely known to entomologists throughout the world as a founder and owner of a firm selling scientific literature, with special emphasis on entomological books and separates, thus rendering a very valuable service to our science.

Duncan Campbell Swan, Australian entomologist who joined our Society only last October, was born on 28th November, 1907, and died suddenly during a visit to this country. He was one of the pioneers of Australian entomology and his main work was associated with the Waite Agricultural Research Institute of the University of Adelaide. He was an energetic organiser and the new laboratories of the Waite Institute, amply provided with facilities for scientific work, have been largely his creation. As a field naturalist, he had an unrivalled knowledge of the Australian fauna and flora and a lively school of ecologists in Southern Australia owes him much for his guidance and inspiration.

H. F. Barnes, although not a Fellow of our Society, was so well known to most of you that I should like to mention him here. His whole career was passed at Rothamsted Agricultural Research Station and all his life was devoted to studies on gall-midges, Cecidomyiidae, but he was anything but a narrow specialist, since his interests covered taxonomy, ecology, distribution, economic status, *etc.*, of these insects. His works on the group covered the world and, apart from numerous papers, he has provided seven volumes on *Gall Midges of Economic Importance.* His death occurred at the age of 57, when he was still in the middle of his life's work.

I would ask you to stand up in memory of our lost friends.

The reports of the Council and the Treasurer leave no doubt that the Society continues to develop its activities. Our numbers are growing steadily and it is particularly pleasant to record that this is largely due to an ever-increasing influx of young Fellows who are bound to bring new interests and a fresh outlook. Another welcome sign is the number of new Fellows from overseas, an evidence that our Society enjoys a wide prestige. In fact, while its name might suggest a restricted sphere of action, the Society is well on the way to becoming world-wide in its connections and influence. This is an achievement but also an obligation.

This leads me to mention two new developments which may contribute to meeting the obligation. One of them is the Council's hope to inaugurate a series of international symposia on problems of wide general interest ; preparations are well advanced for the first symposium on the success of which the future development of the project will depend. Another is the invitation, issued by the Society and generally welcomed, for the XIIth International Entomological Congress to be held in London in 1964. The Society and many of its Fellows will, no doubt, be deeply involved in preparations for the Congress. Indeed, our energetic Secretary did not think that it was too early to start preparations four years ahead, and, as you have heard, the first steps have already been taken to bring into being a special Organising Committee of the Congress. The Committee will be faced with a difficult task, since these congresses have now increased to a size which tends to make them too diffuse. New approach is needed so that the congresses may contribute to welding many branches of entomology together, rather than encouraging still further segregation of specialist interests. This may involve breaking some traditions, but this is inevitable.

The two years of my office proved to be much less onerous than expected. This is entirely due to the inconspicuous but heavy activities of the Officers, the Committees and the Staff, who take on themselves all the work and leave the President to enjoy the honour of the office. I offer all of them my heartfelt thanks and I have no doubt that the meeting will endorse them.

I also would like to thank all Fellows for the unfailing attendance at out meetings, sometimes in numbers suggesting that the present accommodation may soon become inadequate. This growing popularity of our meetings is due to the readiness with which some Fellows and guests provide papers and exhibits of interest to all.

My final duty is to give you my Presidential Address. In selecting a subject for it, I thought it appropriate to follow in the footsteps of my predecessor and to attempt carrying further his excellent review of the study of natural populations of insects.

# QUANTITY AND QUALITY IN INSECT POPULATIONS

### B. P. UVAROV, C.M.G., D.Sc., F.R.S.

**Presidential Address to the Fellows of the Royal Entomological Society of London, delivered at the Annual Meeting on Wednesday, 1st February, 1961.**

The title of my address suggests a problem of wide entomological interest, but you will hardly be surprised if I take locusts as a starting point.

It was 50 years ago that I was first faced with a problem concerning locusts which appeared to me to require only a short study by a taxonomist to be resolved. As I had by then two incomplete years of experience in the systematics of Orthoptera, there was no doubt in my mind that I was fully competent to deal with this little problem. The problem was the existence of the two supposed species of the Migratory Locust, *Locusta migratoria* L. and *L. danica* L., which differed strikingly in their morphological and colour characters, as well as in their habits, the first occurring in swarms, the second singly; they were, however, vaguely connected by individuals and populations with intermediate characteristics. Of course, I thought, this was due to other entomologists not being critical enough to be able to find the real distinguishing characters between the two species, and I set out to do so. My first encounter with the two insects in the field in Northern Caucasus served only to strengthen my conviction, since they appeared to differ not only morphologically, but also in their ecology (Uvarov, 1911). However, further study of more abundant material, with the intention to crystallise the differences, brought nothing but disappointment, since no single character, nor any combination of them, served to separate the two insects and my preconceived ideas were undermined. The final enlightenment was due to the locusts themselves, when from the eggs laid by swarms of one supposed species in 1912 there arose next spring a progeny which included a mixture of the swarming type individuals with many intermediate ones, as well as some typical of a non-swarming population. This perplexing experience was communicated by me to my friend and colleague V. I. Plotnikov working in Central Asia, and in 1914 he informed me that he obtained a change in a reverse direction in the laboratory (Plotnikov, 1915). This complex situation required re-considering the whole problem on a much wider basis. Series of specimens of *Locusta* were obtained from many countries and their study, including the first attempt to use morphometrics, led to the conclusion that there is only one species, *L. migratoria*, which exhibits a special case of unstable polymorphism, one extreme form changing temporarily into another and back, in the course of succeeding generations. The main biological interest of this phenomenon was its connection with the periodic swarming of locusts, during which not only their numbers and morphology, but also their behaviour underwent a striking change. A theory of the process involved began to form in my mind by 1915, but the first World War and my move to Transcaucasia forced me to postpone finalising the work and it might have remained uncompleted, were it not for the chance that brought me, five years later, to London, where it was possible to resume studies on a much wider scale, including material and data from tropical countries. In the course of this work, I started to correspond with Professor J. C. Faure in Pretoria and, on communicating to him my still unpublished ideas, was elated to learn that in 1914 he had made similar observations on the Brown Locust (*Locustana pardalina* Wlk.), a scattered population of which produced a swarming one, with very different morphological and colour characteristics. This evidence Professor Faure generously permitted me to use and it helped to strengthen my ideas on the connection between polymorphism and swarming in locusts, and the first formulation of the phase theory was published (Uvarov, 1921, 1928; Uvarov & Zolotarevsky, 1929).

This historical introduction is offered here merely to show how a wrong start may lead to satisfactory results; also how the same idea, as if floating in the air, has occurred, almost simultaneously and certainly quite independently, to three workers in as many continents. Two of them were duly cautious, but the third was sufficiently rash to propose a working hypothesis. Some of its aspects rested on slender evidence, others reflected immature thinking, but the hypothesis provided a stimulus for further work and both its supporters and its critics contributed to a better understanding of the striking changes in locusts, connected with quantitative fluctuations of their populations.

It was fortunate that the locust proved to be a laboratory animal of such merit that it was able to enter into successful competition with the cockroach, which acquired its academic reputation by infiltrating into dark cupboards and unswept corners. The popularity of the locust as an experimental animal resulted in a rapid accumulation of data on its physiology which went on parallel with field researches on its biology, ecology and biogeography.

It would be out of place here to review the present state of our knowledge of the phase polymorphism in locusts. It is necessary, however, to bring forward those aspects of this phenomenon which have a bearing on the problem of population dynamics in these insects, as a preliminary to a wider discussion. These points are presented, in a greatly simplified manner, in Table I, based on vast literature (most references to it will be found in reviews by Key, 1950 and Kennedy, 1956, and the more important subsequent papers are, *e.g.*, by Albrecht, 1955; Albrecht and Blackith, 1960; Albrecht, Verdier and Blackith, 1959; Blackith, 1961; Blackith and Howden, 1961; Chauvin, 1941; Ellis, 1959*a*, 1959*b*; Ellis and Carlisle, 1961; Hunter-Jones, 1958; L. Joly, 1960; Loher, 1960; Nickerson, 1956; Norris, 1957; Stower, 1959; Strich-Halbwachs, 1959; Z. Waloff, 1958).

The Table shows that the solitary and the gregarious locusts are, in very many respects, two qualitatively very different insects. In the past, most attention has been concentrated on their external differences in colour and morphometrics, but these are now regarded as an ultimate expression of internal processes and, therefore, as indices of the history of a population and of its biological potentialities.

TABLE I.—*Some features of phase polymorphism in locusts*

| | *Solitaria* | *Gregaria* |
|---|---|---|
| BEHAVIOUR | | |
| Tendency to aggregation | Absent | Present |
| Mobility | Lower | Higher |
| Activity rhythm | Not synchronised | Synchronised |
| Adult flight | Nocturnal | Diurnal |
| PHYSIOLOGY | | |
| Food and water reserves at birth | Lower | Higher |
| Early mortality of young | Higher | Lower |
| Development rate | Slower | Faster |
| Instar number | Greater | Less |
| Hopper coloration | Uniform (green) | Yellow-black pattern (no green) |
| Adult coloration | No changes | Changes with maturation and age |
| Fecundity | More, but smaller, eggs | Fewer, but larger, eggs |
| MORPHOLOGY | | |
| Head | Smaller | Larger |
| Tegmen | Shorter | Longer |
| Hind femur | Longer | Shorter |
| Sexual size dimorphism | Pronounced | Slight |

The emphasis now is on the behaviour and metabolism, both of which are affected by population density. Briefly speaking, the change from the solitary to the gregarious phase appears to be initiated by mutual encounters between individuals, which would be more frequent when scattered solitary locusts are concentrated in a more confined area, *e.g.* in more favourable patches of vegetation during a drought (Zolotarevsky, 1933; Uvarov, 1957). Repeated encounters result in habituation, and in learning to aggregate. At the same time, the contacts provide sensory stimuli (visual, tactile, olfactory) which are transmitted, through the central nervous system, to the several endocrine organs and affect the output of their respective hormones. The timing and the balance of the various hormonal activities are thought to produce effects on activity, general metabolism, growth rates and reproduction. This is only a rough and mostly still hypothetical scheme but it suggests that there are several chain reactions involved and it provides a basis for investigating them separately and in combinations. It is of interest to recall here that the present essentially biochemical approach to the phase problem has been intuitively suggested, some 30 years ago, by Faure (1932), who postulated a hypothetical substance called " locustine ", responsible for phase change.

Further important features of locust phases are that the changes are reversible when the density is changed, but not in quite a simple manner. A complication is introduced by the partial transmission of the acquired phase characters to the next generation, as has been confirmed experimentally with regard to most of them. The result is that a reversal of density conditions does not immediately bring about a change of phase, while the continuation of either of the extreme densities for several generations leads to an accentuation of characters of the respective phases.

The facility with which phase changes occur and the extent of the change are not the same in different locust species. In many other acridids, usually called grasshoppers, this ability may be completely absent and no change occurs in nature, nor can it be induced experimentally. In some of them, however, certain features of gregarious behaviour, coloration and morphology have been observed during mass outbreaks and reproduced in the laboratory (Rubtzov, 1935; Vuillaume, 1953).

Let us see now, how phase polymorphism is reflected in locust population dynamics. Quantitative data on this point are still scanty and far from exact, partly because of the exceptional difficulties of accurate assessment of populations with the uneven (clumped) distribution, as well as because of their mobility, especially in the gregarious phase. Nevertheless, some rather instructive figures are available, and examples are offered in Table II.

The Table shows several points of interest. The differences in the actual mean densities of the solitary and gregarious locust populations are not as great as one might expect, but the *maximum* densities reached within the groups of gregarious locusts are vastly different. However, if the respective populations were distributed evenly over the whole infested area, there would be again no striking difference. This means that the main feature distinguishing gregarious populations is not merely the greater total numbers involved, but particularly the strongly clumped distribution of individuals.

Even more instructive are the data for grasshoppers. As can be seen, even in light grasshopper infestations the order of overall density is higher than that reached by gregarious locusts, while heavy grasshopper populations are of a very much higher order than in the case of locust plagues.

These figures demonstrate clearly that the essential characteristic of locusts is their ability to develop gregarious behaviour which results in a strikingly different pattern of population. The initial concentration leading to the phase change is certainly favoured by high numbers of individuals, but it is the consequent *qualitative* change in the locusts themselves which is decisive; grasshoppers lack such ability to respond to the density and their populations remain scattered, or only weakly clumped, in spite of being numerically far superior to swarming locust populations.

Further consequences of the behaviour change in aggregated locusts are, as we have

TABLE II.—*Densities of populations of the Desert Locust* (Schistocerca gregaria *Forsk.*) *and of grasshoppers*

| | Area in sq. miles | Population in Millions | Actual densities (individuals per sq. yard) Mean | Max. | Overall density (millions per sq. mile) |
|---|---|---|---|---|---|
| LOCUSTS | | | | | |
| Solitary, 5 instar, Eritrea, 1950, (1) | 17 | 56 | 2.2 | 9 | 3.3 |
| Gregarious, 5 instar, Kenya, 1955, (1) | 64,000 | 115,200 | 13 | 837 | 8.5 |
| Solitary, Adults, Eritrea, 1950 (2) | 6 | 0.3 | 0.16 | 0.33 | 0.55 |
| Gregarious, Adults, Kenya, 1954 (3) | 70,000 | 465,000 | 30 | 1000 | 0.66 |
| GRASSHOPPERS | | | | | |
| Eastern Siberia (4) | . | . | 1–150 | | 3–450 |
| United States (5) | . | . | 3–64 | | 9–172 |
| Arizona ranges, 5 instar *Melanoplus bilituratus* (6) | . | . | 5–100 | | 15–300 |

(1) Dr. W. Stower, *unpublished* ; (2) Miss Z. Waloff, *unpublished* ; (3) Dr. R. C. Rainey, 1954, 1958–59 and *unpublished* ; (4) Rubtzov, 1935 ; Vinokurov, 1938 ; (5) Shotwell, 1935 ; (6) Nerney, 1955.

seen, physiological, and fully gregarious populations differ from the solitary ones by more rapid development rate, higher mobility, synchronised activities and, probably, lower fecundity, but higher vitality in the more vulnerable early instars. Both types of populations have their advantages and disadvantages, but the phase polymorphism makes the species, as a whole, very versatile, and, therefore, well able to hold its own, in spite of the unstable conditions of the usual locust environments. More detailed ecological considerations are outside the present subject, but it should be clear that, in the case of locusts and, possibly, of some grasshoppers, quantitative fluctuations in populations are intimately related with qualitative changes in individuals.

Leaving now the subject of locusts, significant effects of local densities have been observed in other Orthopteroid orders : Tettigoniidae (Chopard, 1949), Blattidae and Gryllidae (Chauvin, 1946, 1952) and Phasmidae (Key, 1957). Some of the effects were analogous to those known in locusts ; others differed. Thus, in *Blattella germanica* and in crickets the rate of development was not accelerated but retarded by crowding. The essential point, however, is that density affected markedly the quality of populations, particularly as regards the more obvious changes in coloration and morphology of individuals, while the more important physiological and behavioural effects have not been investigated, although may be expected. Amongst other insects, the heteropteron *Eurygaster integriceps* Put. shows significant changes in the metabolism, reproductive activities and vitality during mass outbreaks when these insects tend to exhibit gregarious behaviour (Fedotov, 1947–1955).

The group in which density effects are somewhat better known is Lepidoptera. A general review has been presented by Long (1953), who has also carried out laboratory studies on ten species, seven of which showed a response to density treatment. Some of the better documented data on Lepidoptera are presented in Table III, which shows that the effects of crowding on larvae were similar to those known in locusts.

The effects of larval density on the resulting adults are little studied and obscure (Long and Zaher, 1958). The effects of parental density on progeny, which are so important in locusts, in the only species studied (*Plusia gamma L.*), were to increase the

TABLE III.—*Effects of larval crowding in Lepidoptera*

+, increase ; –, decrease ; 0, no change.

| | Effect in larvae | | | | | | | Effect in adults | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dark colour | Development rate | Instar number | Size | Fat content | Activity | Mortality | Size | Fecundity | Longevity |
| *Plusia gamma* L. (1, 4, 5) | + | + | – | – | + | + | – | ? | + | – |
| *Diataraxia oleracea* L. (1) | + | + | – | . | . | . | – | . | . | . |
| *Leucania unipuncta* Haw. (2) | + | + | 0 | – | . | + | – | . | . | . |
| *Barathra brassicae* L. (3) | + | + | . | – | . | . | . | . | + | . |
| *Laphygma exempta* Walk. (6) | + | . | + | – | + | . | . | . | . | . |

(1) Long, 1953 ; (2) Iwao, 1958, 1959*a*, 1959*b*, 1959*c* ; (3) Hirata, 1956 ; (4) Long and Zaher, 1958 ; (5) Zaher, 1960, Zaher and Long, 1959 ; (6) Matthée, 1945, 1946.

activity, the rate of sexual maturation and the fecundity, and to decrease the adult life (Zaher, 1960). No work has been done to find out whether there is a transmission of any of these acquired characters to the next generation.

Aggregations of larvae and adults are known to occur in many other insects (Le Masne, 1952 ; Chauvin, 1952), but the physiological effects of this behaviour have never been studied.

It may be argued that, with the exception of locusts, the evidence of physiological effects of density is mainly experimental and such situations do not arise in nature. However, field observations on this point are not entirely lacking.

Thus, there exist definite coloration changes in the gregarious Lepidopterous larvae known as army worms (*e.g.* Faure, 1943) and in one of them, *Laphygma exempta*, they are accompanied by considerable physiological changes (*see* Table III), while other cases have not been investigated in this respect. Larvae of a Notodontid moth, *Exaereta ulmi* Schiff, occurring at greater densities in Russia are characterised by uniform dark coloration, larger fat reserves and higher activity, than those in sparse populations; the dependence of such differences on density was confirmed experimentally (Sharov, 1953).

Striking fluctuations in the activity and behaviour of the western tent caterpillar (*Malacosoma pluvialis* Dyar) described by Wellington (1960) in Canada were related to quantitative changes and may also have been due, at least partly, to the density effects.

This, much too rapid, review is sufficient to show that phenomena closely resembling phase polymorphism are not restricted to locusts.

The problem of the quality of insect populations is, however, still wider. It is now generally admitted that even the lowest taxonomic units are composed of populations and individuals which are not identical. This view has been aptly summarised by Hubbell (1956) by saying that " uniform populations are only a taxonomic fiction ", and he referred to morphological criteria only.

Geneticists are, of course, well aware of the heterogeneous nature of species, and studies in population genetics (Dobzhansky, 1951 ; White, 1954) are making excellent progress, including work on phenotypic response to short-term variation in environmental conditions (Thoday, 1956). So far, very little use of this approach has been made by population ecologists.

Much has been written about the biological races in insects (Thorpe, 1931 ; Dethier, 1954), but mainly from the point of view of their food habits, while repercussions on their behaviour, fecundity and mortality must be expected but remain little studied.

One of the reasons for this neglect is that the attention has been concentrated on the possible evolutionary importance of such phenotypic responses to the environment. In spite of a number of cases when environmentally induced variations have been shown to be, at least temporarily, inheritable, there is a reluctance to accept any evidence that might appear to favour the much maligned Lamarckian principle.

It is curious that, in this respect, general biologists tend to be more conservative than geneticists. Waddington's (1957) experimental work has produced clear-cut evidence for the conversion even of a morphological acquired character into an inherited one, in the course of only a few generations, through the process called by him genetic assimilation. Support for the need to admit such a possibility has been recently voiced by Hinshelwood (1960). This should encourage more entomologists to study their problems without being afraid of infringing some outdated canons of textbook genetics. The genetical theory is, in any case, changing rapidly, the gene no longer being imagined as a particle, but as a biochemical agent (Haldane, 1954) and, therefore, its activities and their results are subject to chemical and physical influences. In addition, some forms of non-genic inheritance (*e.g.* cytoplasmic) are freely admitted by many geneticists.

Moreover, I should particularly like to stress that ecologists need not be so much concerned with pondering whether qualitative changes in the objects of their studies are likely to be of evolutionary significance. Indeed, it is the physiological variability and the adaptability of a temporary, reversible kind, closely linked with, also temporary, environmental changes, which are important in population dynamics. My distinguished predecessor in this chair (Richards, 1959) insisted on the present need for exact empirical population studies, rather than for discussions on the relative virtues of the various theories which attempt to put living creatures into the strait-jacket of mathematical formulae. My feelings on this subject are even stronger than his, and it is my firm conviction that progress in understanding fluctuations in the abundance of any insect can only be made through intensive studies both of the changing numerical values and distribution patterns of its populations, as well as of the concomitant changes in the insect itself, which so far have not received the attention they deserve. One hopes that the interdependence of quantity and quality in insect populations, so strikingly illustrated by locusts, will no longer be overlooked by ecologists.

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# BENEFACTIONS.

*List of Donations of the amount or value of Twenty pounds and upwards.*

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The **Royal Society**, for the same, £25.

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The same, £35.

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[*] It has not always been possible to find the exact purpose for which the earlier money gifts were intended, but they appear to have been usually in support of the publications.

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H. T. Stainton, £40.
W. B. Spence, his late father's library.

1885.

J. W. Dunning, £35.
The same, the whole cost of the Society's Charter.

1893.

The same, towards cost of publishing the Library Catalogue, £25.

1894.

The same, £45.
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